



County of Yolo

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First District – Mike McGowan
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Third District – Frank Sieferman, Jr.
Fourth District – Mariko Yamada
Fifth District – Duane Chamberlain
County Administrator – Victor Singh

June 8, 2005

Robert Schneider, Chairman
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova CA 95670



SUBJECT: Cache Creek, Bear Creek, and Harley Gulch Total Maximum Daily Load (TMDL) for Mercury

Dear Chairman Schneider:

The Yolo County Board of Supervisors (Board) would like to once again express concern with the development of the Cache Creek, Bear Creek, and Harley Gulch Total Maximum Daily Load (TMDL) for mercury. We respectfully request that you extend the public comment period for ninety days for review of the May 2005 document entitled "Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Mercury in Cache Creek, Bear Creek, Sulphur Creek, and Harley Gulch – Public Review Draft." We refer to the document as the Total Maximum Daily Load (TMDL) in this letter.

The County greatly appreciates the efforts of RWQCB staff to address the concerns of Yolo County and other stakeholders, but unfortunately the public process has not provided sufficient time for stakeholders to communicate concerns to the RWQCB. The County requests a 90-day extension of the public comment period for the following reasons:

The final draft of the TMDL was released on May 13, 2005 and the RWQCB requested comments by June 8, 2005 - less than 30 days for public review. As a result of many inconsistencies and unclear language in the TMDL, County staff and other stakeholders have communicated extensively with RWQCB staff to understand the requirements of the TMDL. RWQCB staff has responded as quickly as they could, but their time is obviously limited. At the date of this writing, the meaning of much of the language in the TMDL is still unclear to stakeholders.

2. County staff received an email from RWQCB staff with revised TMDL language on June 6, 2005 (two days before the end of the public comment period), partly in response to informal comments by the stakeholders. Again, the County greatly appreciates the willingness of staff to incorporate comments. County staff received another email on June 7, 2005 that provided responses to scenarios posed by the County regarding how the TMDL may affect County activities. Such last-minute changes indicate the need for additional time to ensure the TMDL's language reflects the RWQCB staff's intent. The draft document seems to reflect a lack of internal review for completeness and consistency.
3. Today, the deadline for the public comment period, the County received responses to more than 30 pages of comments submitted to the RWQCB on April 19, 2005. Many of these comments were not addressed in the most recent version of the TMDL, and a few hours is not enough time to review the

RWQCB's responses and incorporate them into the new set of comments we have been composing for weeks.

A final vote on the TMDL should not be held until a complete, consistent document is ready for public review and the public is given adequate time to respond. While the County needs an additional 90 days to fully review the TMDL, this document contains comments on the May 13, 2005 version. County staff and stakeholders have communicated with RWQCB staff since May 13, 2005, and these comments reflect those conversations.

The County remains extremely concerned with the impact the TMDL will have on County activities. The County shares the RWQCB's commitment to protecting the wildlife and recreational values of Cache Creek. For many years, the County has devoted considerable resources to projects along Cache Creek intended to preserve these values. However, particularly to the extent that many beneficial County projects may be curtailed by the proposed TMDL, the County objects to the expenditure of public monies that the RWQCB has not demonstrated will contribute significantly to achieving the water quality objectives set by the RWQCB. These comments are attached. In addition, the County believes that the RWQCB has not complied adequately with the California Environmental Quality Act or statutory requirements to consider economics. County counsel has submitted a separate memo, also attached, that addresses these concerns.

Thank you for your consideration of our concerns and the request for an extension of the 90-day public comment period.

Sincerely,

A handwritten signature in black ink, appearing to read "Helen M. Thomson". The signature is fluid and cursive, with a long horizontal line extending from the end.

Helen M. Thomson
Chairwoman, Yolo County Board of Supervisors

cc: Patrick Morris
Janis Cooke



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**Comments on the
May 2005 Central Valley Regional Water
Quality Control Board's Public Review
Draft Report
of
Amendments to the Water Quality
Control Plan for the Sacramento River
and San Joaquin River Basins
for
Control of Mercury in Cache Creek,
Bear Creek, Sulphur Creek, and Harley
Gulch**

June 8, 2005

Prepared by Petrea Marchand, Yolo County Water Resources Coordinator, with input from the
Cache Creek Mercury TMDL Stakeholders Working Group

INTRODUCTION

The May 2005 Public Review Report of Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Mercury in Cache Creek, Bear Creek, Sulphur Creek, and Harley Gulch is termed the "Total Maximum Daily Load (TMDL)" throughout this document.

In the cover letter preceding these comments, the County has requested a 90-day extension of the public comment period. The County has responded to every document the RWQCB has produced, but the May 2005 version of the TMDL is the most specific of any of the documents available to stakeholders to date. It is obviously a work in progress, fraught with inconsistencies and vague language, and the County and other stakeholders need more time to respond. While this document contains a first cut at comments on the TMDL, the County needs more time to work with the RWQCB to address these comments and to further review the TMDL to evaluate impacts on local activities.

This document contains extensive comments on the May 13, 2005 version of the TMDL, as well as a memo from County Counsel expressing concern that the TMDL has not complied with the California Environmental Quality Act and other California statutes (see Attachments B, C, and D). County staff and stakeholders have communicated with Central Valley Regional Water Quality Control Board (RWQCB) staff since May 13, 2005, and these comments reflect those conversations.

Of primary concern is that the RWQCB's TMDL will divert limited resources away from habitat restoration, invasive species removal, and bank stabilization activities to the mercury TMDL process. From the County's perspective, this would be a very unfortunate reallocation of resources and contrary to the RWQCB's ultimate charge of protecting the environment.

The TMDL also does not prioritize its actions to ensure that the areas that contribute most significantly to the loading of mercury into Cache Creek are addressed first. It requires erosion control and mercury mitigation plans for any project that disturbs sediment with over 0.4 mg/kg of mercury in the finest grained fraction. This threshold level may include most sediment and soil in the region, while identified areas of the watershed contain soil with hundreds or thousands of times more concentrated mercury. The TMDL also does not detail a phased in approach to regulation and remediation. The County is encouraged by public assertions of RWQCB staff that this is the intent of the TMDL, but the current language does not reflect that intent.

Finally, the RWQCB staff bases its numeric water quality objectives on questionable assumptions. Yolo County is concerned these very low target concentrations and associated regulatory requirements may be unwarranted and would have the unintended consequence of discouraging and/or halting a variety of beneficial projects in the watershed. The County believes that some of the Regional Board calculations leading to these low target levels are based on problematic assumptions, such as the assumption that bald eagles receive 50% of their methylmercury intake from eating other birds. Problems identified in these assumptions are detailed in the specific comments.

GENERAL COMMENTS

Comment 1: RWQCB does not appropriately prioritize regulatory actions

The RWQCB proposed to regulate projects that disturb sediment with 0.4 mg/kg of mercury in the fine grained fraction, when mercury in the sediment of the Cache Creek watershed can range up to hundreds or thousands of times this level. The RWQCB does not distinguish between areas with varying levels of mercury in the sediment, except to limit regulatory activities to the 10-year floodplain below Camp Haswell.

The TMDL states that the RWQCB considers 0.20 mg/kg to be the regional background level and cites Churchill and Clinkenbeard (2004) as one of the sources of their determination. The referenced report determined the background level on the basis of only 11 samples of fine-grained soils (with concentrations ranging from 0.07 to 0.31 mg/kg) collected at the periphery of mining sites in the Clearlake Highland (predominantly from upland soils). Nevertheless, given that better information is unavailable, the County accepts 0.20 mg/kg as the background level. Given the magnitude of erosion problems in the watershed, however, the RWQCB's decision to regulate projects that disturb sediment of 0.4 mg/kg in the finest grain sizes – very close to background level and likely a level found in most sediments in the watershed – is questionable.

The same Churchill and Clinkenbeard report indicates that the average “background” levels for mercury in soil/regolith in the vicinity of the mines is 93 mg/kg and that elevated background levels of mercury in the naturally occurring materials are similar to those in mine wastes. It is reasonable to assume that the priority for controlling additional input of mercury to the watercourses within the watershed would be to control erosion of areas with the highest known background concentrations.

What is the purpose of focusing on mercury concentrations in excess of 0.4 mg/kg when existing investigations indicate that the average concentration of mercury in soils/regolith/bedrock (93 mg/kg) in the mining areas is over 200 times greater than this threshold?

Suggested revision: Focus on controlling erosion from areas in the watershed with the highest known mercury concentrations. Eliminate the 0.40 mg/kg requirement and focus on identifying erodible areas with high concentrations of mercury in the soil, similar to the process described elsewhere in the TMDL.

Comment 2: Require best management practices instead of “no net increase” in sediment load

Streambanks erode and deposit naturally, largely driven by stream flow and sediment load into a reach. Erosion control activities in the upper watershed will result in reduced sediment load downstream of those areas. But the sediment carrying capacity of the creeks would remain the same. The most likely result, therefore, would be increased erosion of streambanks and streambeds in the main channel. Indeed, the primary mechanism expected to reduce mercury loads in the creeks is natural erosion of mercury-laden streambanks and replacement with lower mercury material eroded from upstream.

Requiring that any streambank project not allow that natural process to occur is inconsistent with the goal of reducing the amount of mercury-laden sediment in the watershed, which assumes that natural erosion will eventually reduce methylmercury levels in fish tissue.

Suggested revision: Rather than require no net increase in sediment load, simply require that best management practices be implemented for projects that could otherwise cause erosion of elevated mercury sediments into the creeks.

Comment 3: The TMDL does not contain a phased-in approach to implementation

Contrary to what RWQCB staff have expressed publicly, the TMDL does not contain a clear phased approach to implementation of the TMDL. In personal communication, RWQCB staff have stated that the focus will be first on capping the mercury mines, monitoring the results of those actions, and then identifying other means of reducing mercury inputs into the watershed. In a couple of places in the document, staff mention a phased approach (p. 9), but the Implementation Summary (p.10) does not represent a phased approach, just a chronological list of activities. A true phased approach would postpone low-priority regulatory activities until the RWQCB has achieved the high-priority regulatory activities, such as capping the mines and reducing erosion at sites with the highest levels of mercury in the soil. Given that the TMDL can be revised at any time, the RWQCB can adopt additional regulatory activities in the future as appropriate. The RWQCB staff should more specifically define the phased approach than they have in the current version of the TMDL.

Suggested revision: Define the phased approach more clearly. For example:

Phase 1 (2006-2011): Cap mercury mines and monitor results. Identify “hot spots” and low-cost, high-benefit remediation actions in the upper watershed.

Phase 2 (2011-2016): Require remediation at “hot spots” using low-cost, high-benefit remediation actions in the upper watershed.

Comment 4: TMDL does not exempt wildlife habitat restoration, bank stabilization, and invasive species removal activities

Wildlife habitat restoration or invasive species removal projects that may disrupt soil with more than 0.4 mg/kg in the finest grain sizes will be required to either show the RWQCB through monitoring that the soil is less than 0.4 mg/kg or will be required to submit an erosion control plan to the RWQCB. Currently, erosion control plans (known as Stormwater Pollution Prevention Plans) are only required for projects with over one acre of grading.

The TMDL also is unclear as to whether once erosion control plans are implemented, the project proponent will have to monitor to demonstrate mercury is not moving into the creek and what type of monitoring the local entity must undertake (i.e. pre- and post-project, upstream and downstream). In addition, many invasive plant species removal, wildlife habitat restoration, and bank stabilization actually result in a net decrease in erosion over time and typically use best management practices for erosion control – although they are not required for under one acre of grading. These projects should not be subject to the erosion control plan or monitoring requirements for short-term increases in erosion.

Local entities have postponed or abandoned invasive species removal projects in the past because of water quality monitoring requirements similar to those required in the TMDL. Monitoring for mercury is very expensive, both because of lab costs and staff costs to get to the locations to gather the samples and to interpret and present the results. Email communication with RWQCB staff indicates that documentation by photo is acceptable as erosion monitoring, but this language is not in the TMDL. Without a better understanding of the requirements on local entities, it is difficult to estimate the costs and budget accordingly for compliance with the TMDL.

Suggested revision: Exempt wildlife habitat restoration, bank stabilization, and invasive species removal activities. If they are not exempted, specify that documentation by photo is acceptable as erosion monitoring. Also, add “bank stabilization” to the list that includes “native riparian plant restoration” and “invasive species plant removal.”

UNCLEAR AND INCONSISTENT LANGUAGE

Comment 5: Requirements referring to the “10-year floodplain” are ambiguous

The 10-year floodplain is not clearly defined in the TMDL. RWQCB staff requested a definition from stakeholders. To assist with this effort, the County asked its GIS expert and experts retained to develop the Cache Creek Resource Management Plan to research the availability of existing data. They were not able to locate information consistent with the 10-year floodplain. They a boundary developed by merging the 1994 channel bank and the existing 100-year floodplain, as well as 2-year floodplain map. A hydraulic analysis for the 10-year floodplain of the existing channel would be expensive to create, and the location of the floodplain would change continuously over time. In other words, a static map generated for current conditions would only be representative until the channel meanders. A lack of a definition of the 10-year floodplain increases the uncertainty in the regulation and makes it more difficult for project proponents to anticipate the impact. Also, the term “active channel” in the TMDL needs to be changed to 10-year floodplain throughout the document.

Suggested revision: Define the 10-year floodplain in the beginning of the TMDL as within the creek banks. Replace the term “active channel” with 10-year floodplain.

Comment 6: Unclear who is responsible for monitoring, and therefore who pays

Starting on page 69, the TMDL outlines monitoring requirements for fish tissue monitoring associated with determining compliance with the water quality objectives, water quality monitoring associated with determining compliance with aqueous methylmercury goals, monitoring associated with mine site remediation, and sediment monitoring. In addition, throughout the TMDL there is vague reference to monitoring associated with projects. The TMDL does NOT, however, specify who is responsible for the monitoring and therefore who pays. RWQCB staff also does not estimate the costs of these monitoring activities, both to the RWQCB and to local entities (see Comment 17).

Examples include:

1. "Regional Board staff will coordinate participation among landowners in monitoring and continue its own monitoring to identify areas in which mercury concentrations exceed 0.4 mg/kg, dry weight, in fine-grained sediment and soil (p. 71)." What does "coordinate participation" mean? What is the extent of this requirement?
2. The revised TMDL language sent to County staff on June 6, 2005 states, "Compliance with the prohibition will be assessed by conducting monitoring during and after projects are implemented," referring to erosion prevention in the 10-year floodplain downstream of Camp Haswell. It is not clear from this statement what type of monitoring will be required (how extensive) and who is responsible for performing it.
3. The TMDL states, "Through periodic monitoring of the species listed above, staff will know when fish tissue levels approach the proposed objectives (p.70)." There is no mention of who is responsible for the monitoring.
4. The TMDL states, "Regional Board staff will oversee the preparation of detailed monitoring plans and resources to conduct the monitoring of sediment, water, and fish to assess progress towards meeting the water quality objectives (p. 14)." "Oversee" does not mean the Regional Board will conduct the monitoring.

Email communication with RWQCB staff resulted in the assurance that "we are not expecting the County or any other Cache Creek entity to monitor for compliance with the fish tissue water quality objectives. Nor do we expect Yolo County to monitor the entire watershed on an ongoing basis." This is not clear from the TMDL language, however, and should be specifically mentioned. Additional clarification should be added regarding who is responsible for monitoring associated with projects, and the extent of the monitoring required.

Suggested revision: Clarify in the TMDL who is responsible for any monitoring require in the TMDL. Describe the extent of monitoring required. Fully estimate any costs.

Comment 7: Creek Sediment – Upper Watershed section is unclear

The Creek Sediment – Upper Watershed language (p.11) is unclear. What does the sentence "Agencies and landowners shall coordinate with the Regional Board to conduct studies to further refine total mercury and methylmercury sources" mean? Who will pay for such studies? In addition, the following paragraph is unclear:

"As sources are identified, the Regional Board will require landowners to submit a report that evaluates engineering options or management practices to reduce methylmercury concentrations and total mercury sediment concentrations. Emphasis of the evaluations shall be on control of erosion related to or increased by human activities."

What does “emphasis” mean? It is the County's understanding that the focus would only be on human activities. The County also disagrees that the RWQCB should regulate human activities if the benefit in terms of a reduction in mercury-enriched sediment discharges is less than other areas in the watershed

Suggested revision: Clarify language in this paragraph. Specify that the RWQCB will pay for the studies. Specify that the RWQCB will only regulate human activities in areas identified by these studies.

Comment 8: RWQCB has not clearly described the compliance schedule for meeting the water quality objectives or aqueous methylmercury goals

RWQCB staff state in the TMDL that the numeric water quality objectives will not be obtained for 200-500 years, yet they are silent on whether they will fine local entities (which is within their authority) for not meeting the numeric objectives. The TMDL does not establish a compliance schedule, leaving the RWQCB with the authority to fine for non-compliance of unobtainable objectives. The RWQCB needs to state when they realistically expect the implementation measures to have an effect in order to receive feedback on the practicality of those goals.

Suggested revision: Clearly describe the compliance schedule for meeting the numeric objectives. Most important is to clearly describe to what extent the local entities will be expected to meet the numeric water quality objectives within the 30-year implementation time period.

Comment 9: Need definitions of erosion control plans and mercury control plans, especially for under one-acre of grading

RWQCB staff are requiring erosion control plans for all projects within the 10-year floodplain below Camp Haswell that disturb sediment with over 0.40 mg/kg of mercury in the fine-grained fraction and for all projects in the watershed above Camp Haswell. They interchangeably use the term “mercury control plan” and “erosion control plan” (p.49). It is not clear what they mean by an erosion control plan or mercury control plan or how they are different. In personal communication with RWQCB staff, they have stated that local entities already are required to do an erosion control plan for projects that may cause erosion. This is only true for projects that will result in over one-acre of grading. Many invasive species removal projects, habitat restoration projects, trail construction or campsite improvements may involve less than one-acre of grading. It is unclear what type of erosion control plan will be required for projects with under one-acre of grading. The RWQCB also did not estimate the costs of developing these plans.

Suggested revision: Provide a glossary of definitions in the beginning of the TMDL that clearly define erosion control plan, mercury control plan, 10-year floodplain, and other important terms.

Comment 10: The trigger for sediment mercury content is inconsistently defined.

The following inconsistencies were found:

Pag e	Location	Statement
16	Bottom	Silt/clay (<65 microns) fraction
42	Part “3)”	“...where concentrations are greater than 0.2 mg/kg, dry weight.”
48	3 rd parag.	Mercury-enriched areas (0.2 mg/kg avg., 0.5 mg/kg max.) must not increase erosion...0.4 mg/kg avg. must decrease erosion
48	4 th parag.	“elevated soil mercury concentration” average > 0.5 mg/kg
49	3 rd parag.	Fence portions where soils are significantly greater than 0.2 mg/kg

50	2 nd parag.	Project would be exempt if it does not involve disturbance of soils containing greater than 0.4 mg/kg... fines (<60 um)
72	2 nd parag.	Silt/clay fraction, suggested filter size 63 micron

"Fine-grained" could be interpreted as any material passing a 63-um sieve. However, estimates of soil mercury content in the watershed have been based on two types of measurements: (1) the ratio of total mercury concentration to total suspended sediment concentration in water column "grab" samples, and (2) bulk, near-surface soil samples consisting mostly of particles less than 0.25 inch in diameter.

Suggested revision: Define "fine-grained" sediment consistently, as the silt/clay fraction <63 um (material which passes through a 63 µm sieve).

Comment 11: The compliance schedule estimates are presented inconsistently throughout the text.

The following variations were found:

Page	Location	Statement
54	Header	"400+ years for passive cleanup" [Implementation Alternative 1 – No action]
55	1 st full paragraph	"...the time for sediment within the Cache Creek canyon to be mobilized by large storm events to the settling basin could be 400-500 years." [Implementation Alternative 1 – No action]
55	3 rd full paragraph	"...the North fork Cache Creek will continue to erode and deposit cleaner sediment in the Cache Creek canyon, thus diluting the sediment containing mine wastes. This cleaner sediment dilution and burial of the sediment with higher concentrations of mercury could reduce the time for achieving objectives to an estimated 300-400 years." [Implementation Alternative 1 – No action]
62	1 st paragraph	"This could take more than 500 years." [Implementation Alternative 1 – No action]
63	2 nd paragraph	"Although implementation of this Basin Plan Amendment would create measurable changes in mercury loads, full attainment of the objectives may require several hundred years."
66	2 nd full paragraph	"Alternative 1 (No Action) will not result in the attainment of proposed water quality objectives." "As noted above, sediment with elevated levels of mercury could continue to erode from the Cache Creek canyon for another 400-500 years."

The statement on page 66 contradicts the discussion on pages 54-55 in which the RWQCB states that no action would result in attainment of the objectives. Also, the estimates on pages 54-55 are inconsistent. In addition, the variation in estimates illustrates the significant uncertainty associated with implementation of the TMDL, but the uncertainty is never fully discussed in the text.

Suggested revision: Eliminate inconsistent references to time for passive cleanup. Include discussion of the uncertainty of the benefits of required actions.

ECONOMICS

Comment 12: RWQCB has not sufficiently estimated the costs of meeting the water quality objectives.

In addition to the requirement that the water quality objectives ensure the reasonable protection of beneficial uses and the prevention of nuisance, the RWQCB is required by state law to evaluate “economic considerations” as part of the development of water quality objectives (California Water Code § 13241). According to a memo by the RWQCB legal staff (See Attachments C and D), the RWQCB is required to identify the methods through which the water quality objectives established by the RWQCB can be achieved, and the cost of those methods. The RWQCB has not completed this analysis. It will take 200-500 years to meet the water quality objectives according to the TMDL, yet the RWQCB only estimated costs for the first thirty years – and this estimate was incomplete. In addition to an incomplete estimate of monitoring costs (see Comment 17), RWQCB staff did not estimate the cost of developing erosion control plans for projects under one acre of grading, turbidity monitoring, feasibility studies and remediation projects associated with reducing natural erosion.

In addition, mine site remediation costs do not account for management, monitoring, insurance, reporting (p.53), or downstream remediation requirements (p.47). The cost estimate of \$10K-20K for public outreach to high-risk consumers of local fish for the duration of the TMDL is also unrealistic. Yolo County is paying almost \$2,000 this year alone for warning signs regarding mercury levels in fish along Cache Creek, not including staff time for posting the signs. Replacement of frequently vandalized signs will require additional expenditures, as will other public outreach efforts.

Suggested revision: Provide a complete estimate of the costs of the TMDL for 200-500 years, broken down by who is expected to pay.

Comment 13: RWQCB has not shown that the water quality objectives ensure the “reasonable” protection of beneficial uses and the prevention of nuisance.

The Porter-Cologne Water Quality Act requires the RWQCB to establish water quality objectives that ensure the reasonable protection of beneficial uses and the prevention of nuisance. “Reasonable” has been interpreted by the courts in other cases involving the Clean Air Act and the Clean Water Act to require the regulating agency to show that the benefits justify the costs. The RWQCB has not met this standard (see Attachment B).

Suggested revision: Estimate the benefits and the costs of proposed regulations. Demonstrate that the benefits justify the costs.

Comment 14: Need analysis of the benefits of requiring erosion control plans for small projects and projects that disturb sediment with low levels of mercury

RWQCB staff has presented no evidence that small projects along the creek or projects that disturb sediment with levels of mercury greater than 0.40 mg in the fine-grained fraction are a significant source of erosion and mercury loading. Before requiring expensive erosion control plans or remediation activities for projects that benefit Cache Creek (i.e. bank stabilization, wildlife habitat restoration), staff should demonstrate that such actions will significantly reduce mercury and methylmercury loading into the creek. This is especially true for projects under one acre of grading, as existing law does not require erosion control plans for these projects. As suggested in Comment 13, the RWQCB may be required by law to demonstrate that the benefits of their actions justify the costs.

Suggested revision: Include evidence in the TMDL that the actions required for small anthropogenic projects along the creek will significantly reduce mercury loading and methylmercury levels, as well as projects that disturb sediment with low levels of mercury compared to the rest of the watershed. In addition, exempt projects for which evidence shows the net benefit of the project is greater than minor additional mercury loading that may result from the project.

Comment 15: Time periods for implementation plan and achievement of numeric water quality objectives inconsistent

RWQCB staff estimates costs for a 30-year implementation plan, but state in numerous places in the TMDL that compliance with the water quality objectives will take 200 to 500 years. The implementation plan should span at least 200 years or the TMDL should clearly specify what level of reduction they aim to achieve in 30 years. RWQCB staff has publicly admitted that the recommended water quality objectives CANNOT be achieved within 30 years.

Suggested revision: Complete a 200-500 year implementation plan. Alternatively, clearly specify in the TMDL the level of reduction in methylmercury in fish tissue that the RWQCB expects to achieve in the 30-year timeframe.

Comment 16: Insufficient evaluation of implementation alternatives and associated costs

At the first RWQCB hearing on the TMDL, Board member Cabaldon asked:

"I am curious as to the differences in implementation cost (of the 0.23 and 0.30 numeric water quality objectives) and how they relate."¹

RWQCB staff answered that they did not think the cost estimates would change that much between the 0.23 and 0.30 objectives. This statement is true if you look at monitoring and remediation costs over the life of the 30-year implementation plan because neither the 0.23 or the 0.30 objective is attainable within 30 years. This statement is NOT true if you look at costs over the life of achieving the numeric objectives, which is 200-500 years. Since the RWQCB selected 30 years as the implementation timeframe, the RWQCB staff should have provided the Board with an array of implementation options and described the costs associated with each. Instead, the RWQCB did not even fully complete a cost analysis of the implementation plan they did select.

Suggested Revision: Provide six (rather than three) implementation options to demonstrate differences in the costs of implementation options. In addition, the RWQCB should provide more evidence of the contribution of these different implementation alternatives to meeting the water quality objectives.

Comment 17: No estimate of monitoring costs to landowners or project proponents

As stated in Comment 6, it is unclear in the TMDL who will bear the responsibility for monitoring for erosion control plans or other tasks outlined in the TMDL. The RWQCB does not include estimates of these costs to local entities or to the RWQCB. RWQCB staff estimate that methylmercury samples will cost between \$100 and \$113 per sample. According to Yolo County experience with methylmercury sampling, staff or contractor time necessary to collect and prepare samples, reduce and plot data, and report results ranges from 40 to over 100 hours per individual project monitoring and over 200 hours for compliance fish monitoring at between \$75 - \$125/hour. The County estimates, based on the amount paid for methylmercury monitoring at the Cache Creek Nature Preserve and expert input, that methylmercury costs (not including staff time) are approximately \$190 per sample. The range of costs is large because the TMDL is unclear as to what level of compliance monitoring will be undertaken.

Suggested revision: Clarify who is responsible for monitoring, the level of monitoring required, and estimate costs to local entities.

Comment 18: RWQCB monitoring costs are underestimated

RWQCB staff estimates that only 800-1680 samples will be collected and analyzed in Cache Creek sediment over 1-2 years. Communication with RWQCB staff resulted in clarification that this is the

¹ Schwartz, Esther F. Report of the March 18, 2005 meeting of the Central Valley Regional Water Quality Control Board regarding the Amendments to the Basin Plan for the Control of Mercury in Cache Creek, Bear Creek, Sulphur Creek and Harley Gulch.

monitoring the RWQCB expects to conduct. The staff description of the task states that it is to “refine methylmercury source analysis and mercury in Bear Creek to verify mine loads.” It does not include cost of staff time to gather the samples. In addition, it does not include an estimate of the costs of monitoring associated with compliance with water quality objectives or aqueous methylmercury goals. It also covers monitoring over a 30-year period, when implementation of the TMDL is expected to take between 200 and 500 years.

Suggested revision: Provide a complete estimate of monitoring costs for the RWQCB over 200 to 500 years compliance period.

NUMERIC WATER QUALITY OBJECTIVES

Comment 19: Presentations of the various Objective Alternatives are misleading as stated and should be revised

Objective Alternative 4 would bring Cache Creek in line with the US EPA recommended criterion for the protection of human health (National Criterion). This would be a difficult and worthy goal for a watershed noted for very high levels of mercury contamination. The Regional Board staff did not develop Alternative 4. Board staff have presented Objective Alternatives that go well beyond the National Criterion (Alternatives 2 and 3) and strongly recommend the most stringent of these, Alternative 2, which is based on the health of federally listed wildlife in addition to human health. Target fish concentrations for this alternative are 40% lower than those consistent with the National Criterion. Corresponding target water concentrations are over 50% lower. Comments 22-24 below discuss how these low target levels appear to be based on incorrect assumptions and calculations.

Additionally, the use of two different alternatives to represent the US EPA National Criterion for the protection of human health (Alternatives 3 and 4) is confusing. The intent of the National Criterion is represented by Alternative 4, which should replace Alternative 3.

Logically, the alternatives should be arranged in order of increasing difficulty.

Suggested Text Revisions (Front section P ii and elsewhere):

Objective Alternative 1 - No Action. This alternative is for continued application of the Basin Plan’s narrative objective for toxicity. This alternative does not set a numeric limit for the concentration of methylmercury in fish tissue.

~~**Objective Alternative 3.** Objectives are based on the USEPA’s recommended methylmercury criterion for the protection of human health, assuming that people eat mainly trophic level 4 fish. For Cache and Bear Creeks, objectives are 0.3 mg/kg, wet weight in trophic level 4 fish and 0.15 mg/kg in trophic level 3 fish. For Harley Gulch, the objective is 0.05 mg methylmercury/kg, wet weight in small, resident fish.~~

Objective Alternative 4 2. Objectives are also based on the USEPA’s recommended methylmercury criterion for the protection of human health, assuming that people eat equal proportions a combination of trophic level 3 and trophic level 4 fish. For Cache and Bear Creeks, objectives are 0.40 and 0.20 mg/kg, wet weight in trophic level 4 and 3 fish, respectively. For Harley Gulch, the objective is 0.05 mg methylmercury/kg, wet weight in small, resident fish.

Objective Alternative 2 3. These numeric objectives are based on protection of sensitive wildlife species and in addition to human health. For Cache and Bear Creeks, they are 0.23 mg methylmercury/kg fish, wet weight in trophic level 4 fish (piscivorous species including bass and catfish) and 0.12 mg/kg in trophic level 3 fish (bluegill, sunfish, and sucker). For Harley Gulch, the objective is 0.05 mg methylmercury/kg, wet weight in small, resident fish (such as roach and hardhead less than 4 inches in length). (The 0.12 and 0.23 target concentrations need to be adjusted—see comments below.)

Comment 20: Alternatively, keep all 4 Alternative Options and their current numbering, but re-word and re-arrange the order of presentation

If all 4 alternatives are to be retained, together with their existing number designations, the two human health based alternatives (3 and 4) should be presented together, before the more restrictive and speculative wildlife based alternative (Alternative 2).

There are also some issues with the way the two human health based alternatives are presented. As presented, the wording creates the impression that Alternative 4 is an unlikely scenario ("equal proportions of trophic level 3 and 4 fish") while Alternative 3 appears less specific and more reasonable ("mainly trophic level 4 fish"). In fact, Alternative 3, as presented, assumes that people eat entirely large, trophic level 4 fish. In addition to the fact that fish below trophic level 4 are routinely taken in Cache Creek, the document points out that even for the most contaminated trophic level 4 target species, bass, typical catches are in the 8-10 inch range, considerably lower in mercury and functionally at a lower trophic level than the 10-14 inch fish to be used for compliance monitoring. Widespread censusing of angling catches by the US EPA found trophic level 4 fish to constitute only 33% of typical catches, as compared to 100% as presented in Alternative 3. Presentation of the human health based criteria should be consistent with the intentions of the National Criterion and assume a combination of species and trophic levels, as has been done in Alternative 4. Alternative 4 estimates this mixture by using proportions of 50% large trophic level 4 fish and 50% large trophic level 3 fish, which is a more conservative proportion than the National default percentages based on extensive censusing.

Suggested Text Revision.

Objective Alternative 1 - No Action. This alternative is for continued application of the Basin Plan's narrative objective for toxicity. This alternative does not set a numeric limit for the concentration of methylmercury in fish tissue.

Objective Alternatives 3 and 4 are based on the USEPA's recommended methylmercury criterion for the protection of human health:

Objective Alternative 4. Objectives ~~are also~~ based on the ~~USEPA's recommended methylmercury criterion for the protection of human health criterion, assuming~~ assume that people eat ~~equal proportions~~ a combination of trophic level 3 and trophic level 4 fish. For Cache and Bear Creeks, objectives are 0.40 and 0.20 mg/kg, wet weight in trophic level 4 and 3 fish, respectively. For Harley Gulch, the objective is 0.05 mg methylmercury/kg, wet weight in small, resident fish.

Objective Alternative 3. Objectives ~~are also~~ based on the ~~USEPA's recommended methylmercury criterion for the protection of human health criterion, assuming~~ assume that people eat ~~mainly large,~~ trophic level 4 fish exclusively. For Cache and Bear Creeks, objectives are 0.30 mg/kg, wet weight in trophic level 4 fish and 0.15 mg/kg in trophic level 3 fish. For Harley Gulch, the objective is 0.05 mg methylmercury/kg, wet weight in small, resident fish.

Objective Alternative 2. These numeric objectives are based on protection of sensitive wildlife species and in addition to human health. For Cache and Bear Creeks, they are 0.23 mg methylmercury/kg fish, wet weight in trophic level 4 fish (piscivorous species including bass and catfish) and 0.12 mg/kg in trophic level 3 fish (bluegill, sunfish, and sucker). For Harley Gulch, the objective is 0.05 mg methylmercury/kg, wet weight in small, resident fish. (such as roach and hardhead less than 4 inches in length). (The 0.12 and 0.23 target concentrations need to be adjusted—see additional comments below)

Comment 21: Objective Alternative 4 should be the recommended Alternative

As noted above, attainment of conditions consistent with the National Criterion for the protection of human health (Alternative 4) would be a worthy and difficult goal for this highly mercury-enriched watershed. Additionally, as described below, target concentrations associated with this objective are very similar to those calculated to be protective of the federally listed species exposed to Cache Creek mercury through their diets.

Suggested revision: Recommend Objective Alternative 4.

Comment 22: Objective Alternative 2 fish criteria continue to need revision.

The 0.12 ppm (TL3 fish) and 0.23 ppm (TL4 fish) target criteria presented in Objective Alternative 2 have been shown to be derived with problematic calculations and assumptions. More realistic alternatives, based on existing local watershed data, have been provided. Interestingly, they result in criteria concentrations very similar to those of Alternative 4 for the protection of human health. However, these alternative calculations have been rejected in their entirety by Board staff. It is important to carefully re-examine the fish criteria concentrations associated with Alternative 2 for several reasons: (1) Regional Board staff are strongly promoting this Alternative; (2) much of the overall TMDL, including linkage to target water concentrations and associated load allocations, ultimately derives specifically from the target fish criteria concentrations of Alternative 2; and (3) the target fish criteria concentrations of Alternative 2 are dramatically influenced by assumptions about minor diet items of one species, the bald eagle.

Suggested Revision: Recognize that the bald eagle diet is dominated by fish and that we have good information on mercury levels in Cache Creek fish of the sizes and types available for the eagles to consume. This primary component of the Cache Creek eagle diet should be adjusted accordingly. The revised calculations were rejected by Regional Board staff based entirely on the portions relating to fish-eating and non fish-eating waterfowl as potential eagle diet items. These potential bird portions of the eagle diet, and the estimation of their relative mercury concentrations, should be the subject of continued discussion, leading to revised wildlife-based target criteria concentrations that are more consistent with the criteria based on human health (see Comments 23 and 24 below).

Comment 23: Objective Alternative 2 criteria calculations relating to the presumed bird portions of the Cache Creek bald eagle diet need to be revised.

These particular components of the wildlife-based Alternative 2 criteria calculations, in their current form, have a disproportionately large weighting, skewing the resulting criteria concentrations substantially lower. This needs to be corrected.

The relative frequency or percentage of mercury-relevant birds in the bald eagle diet should be re-examined, as should the presumed frequency of trophic level 4 fish (next comment). The larger problem, however, is the *relative mercury concentrations* assigned to these potential waterfowl in the Cache eagle diet. As presented in Alternative 2, piscivorous and non-piscivorous waterfowl are assumed to constitute 18% of the Cache Creek eagle diet and over 50% of their methylmercury intake. This results from assumptions of large trophic mercury multipliers between Cache Creek food items and these birds—under equilibrium or permanent resident conditions. In fact, potential prey birds in these categories in the Cache watershed are overwhelmingly winter migrants that live and accumulate mercury primarily in other locations.

The primarily migratory nature of the bald eagles themselves, and presumed significantly lower mercury exposure in other locales, has not been explored.

Suggested Revision: The actual numeric importance of waterfowl in the Cache eagle diet should be re-considered. Small numbers of common mergansers have been known to winter in the Cache Creek

Canyon, though the canyon in winter is not a hospitable habitat for puddle ducks, coots, or grebes, and these species are rarely noted there during the time eagles are most prevalent.. Assessing 18% of the eagles' diet and over 50% of their methylmercury exposure to these potential sources appears to be unfounded. Further, as these potential prey items are migratory, it is not realistic to use an equilibrium linkage between their mercury levels and food they may consume while wintering on Cache Creek. Their linkage to Cache Creek conditions will range from 0% in young birds just arriving to roughly 40% in some birds at the end of their winter stays. Calculations should take this into account, with appropriate weighting given to the much lower average exposure levels in other regions these birds reside in. Finally, it should be noted that wintering waterfowl are present during a time of year with among the lowest documented seasonal mercury levels in Cache Creek prey fish and invertebrates. This should also be taken into account in weighting the estimated mercury levels of wintering waterfowl that may be included in the Cache bald eagle diet.

As a default scenario, the Cache Creek bald eagle equation can be re-calculated with the hypothetical waterfowl prey components of the diet replaced with additional Cache Creek fish. Using the same proportions of TL3 and TL4 fish used by the Board, the following equation and criteria concentrations result:

$$0.195 \text{ ppm} = (0.89 \times 81.7\% \times \text{TL3conc}) + (0.89 \times 18.3\% \times \text{TL4conc})$$

$$0.195 \text{ ppm} = (0.727 \times \text{TL3conc}) + (0.163 \times \text{TL4conc})$$

$$0.195 \text{ ppm} = (0.727 \times \text{TL3conc}) + (0.163 \times 2.34 \times \text{TL3conc})$$

$$0.195 \text{ ppm} = (0.727 + 0.381) \times \text{TL3conc}$$

$$0.195 \text{ ppm} = 1.108 \times \text{TL3conc}$$

$$\text{TL3conc} = 0.176 \text{ (0.18 ppm)}$$

$$\text{TL4conc} = 0.176 \times 2.34 = 0.412 \text{ (0.41 ppm)}$$

These concentrations are very similar to those consistent with the US EPA National Criterion (Objective Alternative 4). These fish concentrations would be protective of Cache Creek bald eagles if they ate additional Cache Creek fish rather than the presumed waterfowl component of their diets. They would also be protective for all scenarios containing waterfowl prey in which the mercury content of those waterfowl averaged at or below that of Cache Creek fish.

Comment 24: The estimated fraction of trophic level 4 fish in the bald eagle diet in Objective Alternative 2 criteria calculations should be revised.

Objective Alternative 2 criteria calculations also assume that, of the fish portions of the bald eagle diet, 18.3% are relatively high mercury, trophic level 4 fish. Using this percentage, trophic level 4 fish are calculated to provide the eagles 31% of the methylmercury input that they obtain directly from fish. The estimate of 18.3% of the eagles' fish take being trophic level 4 fish appears to be an over-estimate that also skews the Alternative 2 criteria concentrations. Eagle studies indicate that bald eagles typically take fish opportunistically, including dead or disabled individuals such as fish temporarily stunned by mishaps in rapids. Eagles have been noted repeatedly in the Cache Creek canyon in winter, perched in trees at the base of rapids, scanning for just these types of opportunities. Disabled or otherwise available fish of different trophic levels should occur roughly in proportion to their population proportions in the creek. Piscivorous (TL4) fish, at the top of the aquatic food chain, are typically present in far lower numbers than trophic level 3 species, due to food web structure and basic ecological principles. In the most regionally-relevant bald eagle study referred to in the TMDL, conducted in Northern California, trophic level 4 fish were found to constitute 11% of the eagle fish take. In contrast, the 18.3% estimate used in the Alternative 2 calculations increases the relative weighting of the trophic level 4 fish component by 66% ($18.3\% / 11\% = 166\%$).

Suggested Revision: Use the Northern California bald eagle study data to estimate the proportion of trophic level 3 and trophic level 4 fish in the fish portion of the bald eagle diet: 89% trophic level 3 and 11% trophic level 4.

Again, as in the previous Comment, recalculating the Cache Creek bald eagle dietary mercury equation with additional Cache Creek fish taking the place of presumed waterfowl diet items, but using the fish trophic proportions of the Northern California eagle study, the following equation and criteria concentrations result:

$$0.195 \text{ ppm} = (0.89 \times 89\% \times \text{TL3conc}) + (0.89 \times 11\% \times \text{TL4conc})$$

$$0.195 \text{ ppm} = (0.792 \times \text{TL3conc}) + (0.098 \times \text{TL4conc})$$

$$0.195 \text{ ppm} = (0.792 \times \text{TL3conc}) + (0.098 \times 2.34 \times \text{TL3conc})$$

$$0.195 \text{ ppm} = (0.792 + 0.229) \times \text{TL3conc}$$

$$0.195 \text{ ppm} = 1.021 \times \text{TL3conc}$$

$$\text{TL3conc} = 0.191 \text{ (0.19 ppm)}$$

$$\text{TL4conc} = 0.191 \times 2.34 = 0.447 \text{ (0.45 ppm)}$$

These concentrations are again very similar to those consistent with the US EPA National Criterion (Objective Alternative 4). As in the previous comment, these fish concentrations would be protective of Cache Creek bald eagles if they ate additional Cache Creek fish rather than the presumed waterfowl component of their diets. They would also be protective for all scenarios containing waterfowl prey in which the mercury content of those waterfowl averaged at or below that of Cache Creek fish.

Comment 25: The presentation of the four Alternatives in general, and the Alternative 2 criteria concentrations in particular, should be revised throughout the TMDL, as well as in the summary sections.

Comment 26: (P 43-45) Linkage of fish mercury concentrations to methylmercury target concentrations in water should include other fish criteria levels in addition to those of Board staff's preferred Alternative 2.

The water target concentration discussed in this section (0.14 ng methylmercury per liter for main stem Cache Creek) is based solely on the Objective Alternative 2 fish criteria target levels of 0.12 ppm for trophic level 3 fish and 0.23 ppm for trophic level 4 fish. As noted in Comments 22-24 above, these target fish concentrations should be revised.

Suggested revision: Target water concentrations corresponding to Objective Alternative 2 fish criteria should be revised following revision of those fish criteria concentrations. Target water concentrations corresponding to Objective Alternative 4 fish criteria, consistent with the National Criterion for the protection of human health (0.20 ppm trophic level 3 fish and 0.40 ppm trophic level 4 fish) should also be presented. The water concentration corresponding to this alternative (approximately 0.30 ng methylmercury per liter for main stem Cache Creek) is more than double the target concentration proposed in relation to Alternative 2.

Comment 27: (Appendix H) Methylmercury load allocations should include other fish criteria levels in addition to those of the Board staff's preferred Alternative 2.

Revised load allocations discussed in this section are based entirely on the water target concentrations corresponding to Objective Alternative 2. Objective Alternative 2 is based on fish criteria concentrations of 0.12 ppm for trophic level 3 fish and 0.23 ppm for trophic level 4 fish. As noted in Comments 22-24 above, these target fish concentrations should be revised.

Suggested Revision.

Revise Objective Alternative 2 fish criteria concentrations.

Revise corresponding water targets.

Revise load allocations accordingly.

Also present load allocations corresponding to the National Criterion for the protection of human health (Alternative 4).

Comment 28: (P ii of front summary section, etc.) In staff recommendations of Objective Alternative 2, some of the wording is misleading.

Suggested Text Revision: Staff recommends adoption of Objective Alternative 2. These objectives will protect local threatened and endangered species, including bald eagles. Attainment of these objectives would allow humans to safely consume 22-40 g/day (3-5 meals/month) of Cache and Bear Creek fish, depending upon size and species of local fish and intake of commercial fish. This range is ~~slightly more than approximately double~~ the USEPA default consumption rate (17.5 g/day) used in ~~Alternatives 3 and 4~~ human health calculations and corresponding to the 90th percentile of angling fish consumption.

Analysis of the calculations used indicates that substantially higher objectives would also be protective of local threatened and endangered species, primarily bald eagles.

Comment 29: Please clarify wording relating to potential water discharges from off-channel habitat restoration projects, etc.

This is potentially very important wording that has been addressed in parts of the document, but not others. Taken literally, the initial wording precludes the flow of any amount of water from any project to Cache Creek, which could effectively preclude many worthwhile projects. It is the issue of apparently “not one additional molecule” vs “not resulting in an increase in Cache Creek mercury concentrations.” The County was assured by Board staff that the latter interpretation is the intention.

Suggested Text Revisions.

(P iv)

Actions to reduce methylmercury include additional studies of sources and possible control in Bear Creek and Anderson Marsh; and prohibition of increases in net Cache Creek methylmercury concentrations from inputs from any new impoundments, wetlands restoration projects, or geothermal spring development.

(P 12)

New Reservoirs, Ponds, and Wetlands Regional Water Board staff will review proposals for new impoundments for their potential of methylmercury production. Wetlands and new in-stream and off-stream water storage facilities shall be constructed and operated in a manner that would preclude a net increase in methylmercury concentration ~~entering in~~ in Cache Creek or its tributaries.

Gravel mining pits in lower Cache Creek being reclaimed as ponds and wetlands shall be designed and operated to minimize methylmercury entering Cache Creek. If new reclamation projects result in ~~an a~~ a net increase of methylmercury or total mercury ~~discharged to~~ concentrations in Cache Creek, the project proponents shall submit a report of waste discharge and propose modifications or remediation projects. Please also adjust wording elsewhere in the TMDL, if necessary, to reflect these intentions.